

Construction of nursing HRM model based on "manpower supermarket" resource bank

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Abstract

Objective: To explore the effect of implementing "manpower supermarket" resource bank management in the nursing human resource management of Jiangsu Province Academy of Traditional Chinese medicine.

Methods: The concept of supermarket management was first developed and applied to the administration of manpower services. Next, the structure of nursing nursing human resource management was established. By developing the "commodity" bank of the "manpower supermarket", comprising ① general nurse bank, ② special post mobile bank ③ post ability refueling bank. The quality of "goods" is ensured by combining job training and recruitment unit criteria. In parallel, a standardized selection path is created, including the standardization of the order-sending review process, the implementation of the "commodity" maintenance regulations, and the screening of the conditions of the selection units, ensuring the streamlined operation of the "manpower supermarket".

Results: A total of 1,284 nurses were dynamically deployed in the hospital from October 2021 to October 2022 in 31 different batches. In addition to boosting the quality of nursing human resource management and the quality of specialized nursing care, the high frequency of staff deployment and orderly and innovative management decreased the rate of patient complaints and the turnover rate of nurses.

Conclusion: It is worth learning from the manpower supermarket management which

combines diversified staffing needs, the need for flexible nursing staff management in the management of routine epidemic prevention and control, as well as nursing staff capacity development to meet the needs of nursing human resource management in the current state of medical services.

Key words: Manpower supermarket; Jiangsu Province Academy of Traditional Chinese medicine; Nursing human resource management; Model construction

The Corona Virus Disease 2019 (COVID-19) was classified as a worldwide pandemic by the World Health Organization in March 2020 ^[1]. Its outbreak has been prevented and controlled most successfully by China, while the world situation is still tight, and thus China is still at risk of "importation and backflow" from overseas ^[2]. Public hospitals are frequently in a state of "alarm" for managing nursing human resource as a result of the COVID-19 pandemic due to the increased demand for medical services, increased medical responsibilities, and the intense work being done to avoid the epidemic. According to studies, 270 research articles have been published since 2020 on nursing human resource ^[3]. However, there are few studies on nursing HRM in public hospitals in the current environment. "Manpower supermarket" describes how human resources services are operated like a supermarket. Companies may easily choose the human resource services they want by using this approach, like buying in a supermarket. This mode was initially implemented in Anhui Province ^[4].

1. Information and methods

1.1 General data

The study's participants were the 437 nursing staff members from a large, comprehensive, integrated tertiary public hospital in Jiangsu Province. The hospital has developed a multi-level nursing talent structure and has been using the tiered training management of N1–N4 levels for in-service nurses for many years. The hospital has completed nearly 20 out-of-hospital anti-epidemic support missions since the COVID-19 pandemic outbreak in the past two years, ranging from the isolation for treatment of suspected and confirmed patients, to the vaccination of COVID-19 in the district, to the support of provincial and municipal mobile cabin hospital teams, as well as nucleic acid sampling teams. The "manpower supermarket" management was established in 2022 to relieve the demand for nursing resources, and a certain experience was accumulated, which is presented below.

1.2 Method

1.2.1 Setting of management groups

Under the theory of hierarchical management, the hospital created a three-level management structure with the resolution layer, the presiding layer and the practice layer as the major body. The presiding layer is made up of the director and deputy director of the nursing department, who make specific coordination arrangements following the reality of nursing work in the hospital; the resolution layer is made up of the leaders in charge of the hospital, who primarily carry out the overall planning in conjunction with the overall requirements of the national, provincial, and municipal

health and health committees and the hospital. The nursing HRM project team, department nurse leaders, and ward nurse leaders make up the practice layer. Their key responsibilities include formulating project standards, staff training, data tracking, process optimization, etc.

1.2.2 Operation planning

1.2.2.1 Confirmation of operation characteristics

The characteristics of supermarkets of small profit, small packaging of goods, customer choice, and payment by one settlement out of the door are transformed into the following by the super supermarket operation of human resource services [6]: low seniority and low title personnel as the basis of thin profit; single personnel, single nursing project, and single special nursing skills as the focus; wards with needs applying independently as the operation chain; and personnel work performance paid by monthly units.

1.2.2.2 Screening of the "commodity" bank

The nursing department chooses criteria and reserves the nursing manpower resource deployment bank—also known as the "commodity" bank—in batches by the demands of the wards based on the experience of manpower management from the previous period. The "commodity" bank includes ① General Practice Nurse Bank. Selection criteria include the following: a. Nursing staff actively involved in clinical nursing work, including clinical front-line and clinical non-front-line departments; b. Nursing staff of N1-N3 ability levels; c. Parental (or spouse) support; d. Absence of any pertinent family issues; and e. Voluntary enrollment and active cooperation in this study. a. Nursing employees on internship, advanced training, sick leave, or sabbaticals, as well as those doing non-clinical nursing work, nurse leaders, and N4 nurses, are excluded; b. emotionally unstable people or those who have family obligations are also excluded. ② Special positions motorized bank. a. A title of provincial specialized nurse and the Nanjing Nursing Association Internet + nursing pre-service training certification are required for enrollment in the "Internet Net Nursing bank". Priority is given to people with research expertise, specialized nurses, and hospital nursing staff in the "Research Ward Nursing Bank", which is based on the "General Practice Nurse Bank". b. "Medical Examination Center Phlebotomy Nursing Motorized Bank". c. "research ward nursing bank" based on the "general nursing bank" ideally with expertise in scientific research, specialized nurses, and hospital nursing skills. ③ Position ability refueling bank. a. Emergency infusion emergency bank: the bank is composed of newly recruited nursing staff who are undergoing the three-year standardized training period; the bank members are required to participate in their spare time and cooperate with the implementation of the "100 Needle Puncture Program" as volunteers; the discharge criteria is more than or equal to 100 times of venipuncture. b. Acute care promotion bank: Those who are admitted to the bank are nursing staff with N2 level nurse qualification and intend to declare N3 level qualification within one year.

1.2.2.3 Cultivation of general nursing competence to ensure the quality of "commodity"

① The structural plan for the development of the general nursing competence of

nursing staff is established, and the training contents and techniques are based on the principle of unified allocation of the hospital's bed allocation center for the entire hospital's specialty admissions, Table 1.

②The nurse leader who is a member of the nursing human resource team takes charge of the training team, and the nurse leader of the appropriate speciality is a member of the team. The two of them work together to construct the lesson plan for the group's training in general nursing competence referred to as the "teaching plan". The "teaching plan" has a total of 80 hours of instruction time and a two-week training period. It consists of four components: relevant knowledge, professional knowledge, professional skills, and practical evaluation. ③Centralized lectures and CDIO modes are employed for instruction and assessment, while written tests and situational assessments are used for evaluation ^[5-7]. The evaluation findings were based on each person's annual performance.

Table 1 Specialized training portfolio for general practice nursing

Specialty System	Related Specialties
Acute and Critical Care	EICU, Emergency Department, ICU, PICU, NICU
General Surgery	General Surgery, Mastectomy, Proctology, Urology
Basic Internal Medicine	Geriatrics, gastroenterology, respiratory medicine, oncology, nephrology, endocrinology
Trauma and Neurology	Neurosurgery, Neurology, Orthopedics
Maternity and Pediatrics	Gynecology, Obstetrics, Labor and Delivery, Pediatrics
Cardiovascular	Cardiothoracic surgery, cardiovascular department, CCU, interventional room
Specialties	Operating room, supply room, endoscopy room

1.2.3 Purchase process

1.2.3.1 Conditions for purchased units

① Bed utilization rate $\geq 95\%$ in the past 2 weeks; ② 20~30% year-on-year increase in the number of critical patients; ③ Scheduled sections that need to be drafted for sudden public events, etc.

1.2.3.2 Order sending and review process

The unit nurse leader sends the staff demand order → the human resource team of the nursing department reviews and confirms whether the conditions are met → screening the nursing units with bed utilization rate $\leq 80\%$ in the past 1~2 weeks and ranks the weekly bed utilization rate from lowest to highest → locking the qualified staff according to the specific nursing characteristics of the staff demand ward → the special person of the nursing department notifies the staff to complete the order.

1.2.3.3 Provisions on the maintenance of "commodities"

① During the period of performing the nursing work ordered by the "supermarket", the performance and assessment of the nursing staff shall get the same treatment as the staff of the same level in the unit; ② The working hours of special positions shall be set following the requirements of the positions. In principle, the daily working time is between 4 hours and 8 hours, and the performance is issued by the overtime working hours; ③ online-hiring nursing workers spend personal spare time, and 70% of the service fee is issued to the individual.

1.3 Evaluation indicators

1.3.1 Nursing human resource deployment

Statistics on the batches and numbers of nursing human resource deployment in the hospital from October 2021 to October 2022 were collected.

1.3.2 Time consumption on redeployment and success rate of one-time redeployment

The time spent on the redeployment of nursing staff and the number of people who were successfully redeployed at one time in the hospital in the two time periods from October 2020 to October 2021 and from October 2021 to October 2022 were counted. The success rate of one-time redeployment = the number of successful deployments/total number of deployments $\times 100\%$.

1.3.3 Quality of nursing human resource management

The nursing department of the hospital created a form for nursing human resource management quality control supervision and assessment, which was adopted. The form included five items—man-post matching, reasonable scheduling, job stratification, hierarchical matching, and dynamic deployment—each of which was scored at 100 points. Every month, 26 clinical nursing units in the hospital are to be randomly inspected by the head and secretary of the quality management team of the nursing department to conduct scoring and assessment. The average performance of nursing units before and after the implementation of the "manpower supermarket" is then counted.

1.3.4 Qualified rate of specific nursing quality

The nursing quality supervision questionnaire made by the nursing department of the hospital, including the nurses' mastery of patients' conditions, the efficiency of health education and patient satisfaction with nursing work, was adopted. Before and after 3 months of "manpower supermarket" management, questionnaires were randomly handed out to patients. On the day of patients' discharge, questionnaires were distributed and collected on-site. 100 copies of questionnaires were distributed and 98 valid questionnaires were collected, with an effective recovery rate of 98%.

1.3.5 Patient complaint rate and nurse turnover rate

The numbers of patient complaint case and nurse turnover case for each year before and after the implementation were counted through the hospital management and attendance system. Patient complaint rate = number of complaints/total number of patients $\times 100\%$. Nurse turnover rate = the number of staff turnover/total number of nurses $\times 100\%$.

1.3.6 Statistical analysis

The SPSS 13.0 statistical software was applied, the count data were described by number and percentage, the χ^2 test was adopted for comparison between groups, the measurement data were described by mean \pm standard deviation, and the t-test was conducted for statistical analysis between groups.

2 Results

2.1 Nursing human resource deployment

Based on the sickbed-to-nurse ratio and sickbed utilization rate in each hospital ward, 400 nursing staff members were chosen to join the nursing human resource

deployment bank between October 2021 and October 2022. A total of 31 batches of staff members, totaling 1284 nurses, were dynamically deployed (Table 2 and Figure 1). Among them, there were 20 instances of various support jobs for epidemic prevention and control, and the medical staff infection rate was zero.

Table 2 Basic information of nursing human resource deployment

Item		Number
Gender	Male	3
	Female	1281
Title	Nurse	152
	Nurse Practitioner	491
	Supervising Nurse Practitioner	592
	Associate Chief Nursing Officer	49
Academic qualification	College degree	391
	Bachelor degree	891
	Master and above	2
Years of work (years)	1~5	256
	6~10	527
	11~15	270
	15~20 years	157
	Over 20years	74
Out-of-hospital anti-epidemic	YES	320
	NO	964

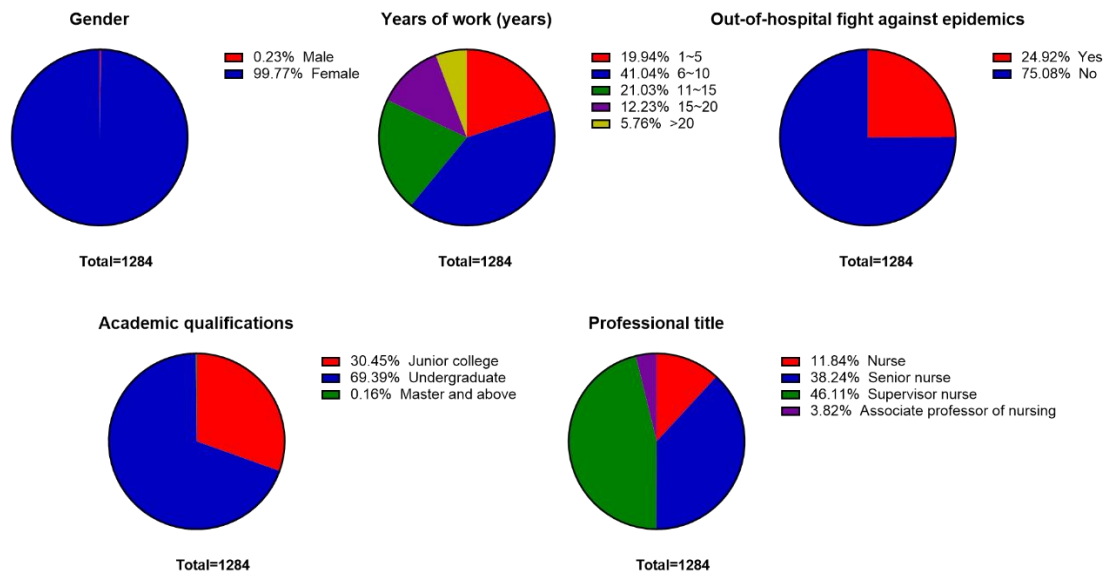


Figure 1 Basic situation of nursing human resource deployment

2.2 Success rate and deployment consumption time

After the implementation of the "manpower supermarket" resource bank, the success rate of nurses' deployment was 97.18%, which was significantly higher than that of 80.54% before the implementation ($P < 0.05$). The deployment consumption time after implementation was (2.57 ± 1.05) h, which was significantly lower than that before implementation (8.77 ± 2.33) h ($P < 0.05$) (Table 3 and Figure 2).

Table 3 Comparison of blending success rate and consumption time before and after implementation

Item	Nurse deployment visits (n)	One-time blending success rate	n (%)	Deployment consumption time (h)
Before	1187	956(80.54)		8.77±2.33
After	1284	1247(97.12)		2.57±1.05
X^2/t value		175.334		88.964
P value		0.000		0.000

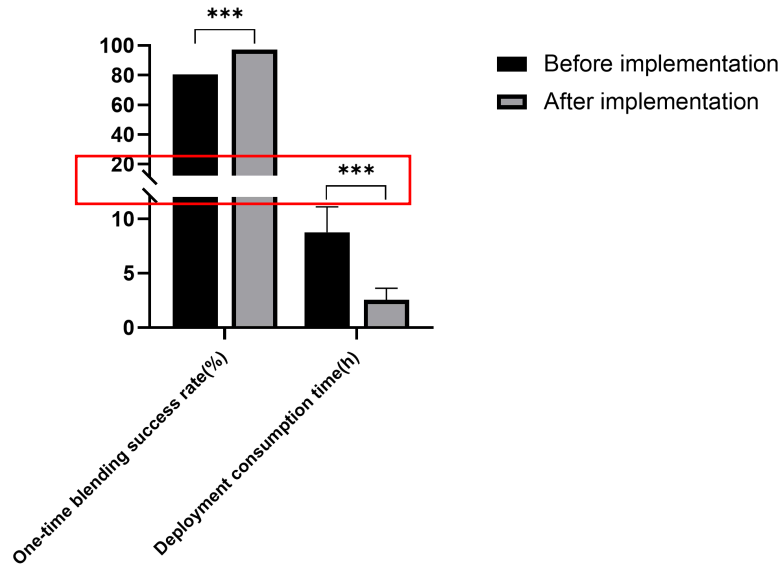


Figure 2 Comparison of the success rate of one deployment and the time consumed for deployment before and after implementation (**P < 0.001)

2.3 Quality improvement of nursing HRM (Table 4 and Figure 3)

Table 4 Comparison of nursing HRM quality evaluation before and after implementation [n(%)]

Item	Total number of cases (n)	Job matching	Reasonable scheduling	Job stratification	Layer matching	Dynamic deployment
Before	26	86.52±2.13	82.17±1.12	88.85±1.63	92.17±1.12	81.85±1.63
After	26	95.35±1.47	92.76±0.56	95.06±1.02	98.76±0.56	97.06±1.02
<i>t</i> value		-22.561	-30.281	-21.004	-27.285	-25.004
<i>P</i> value		0.000	0.000	0.000	0.000	0.000

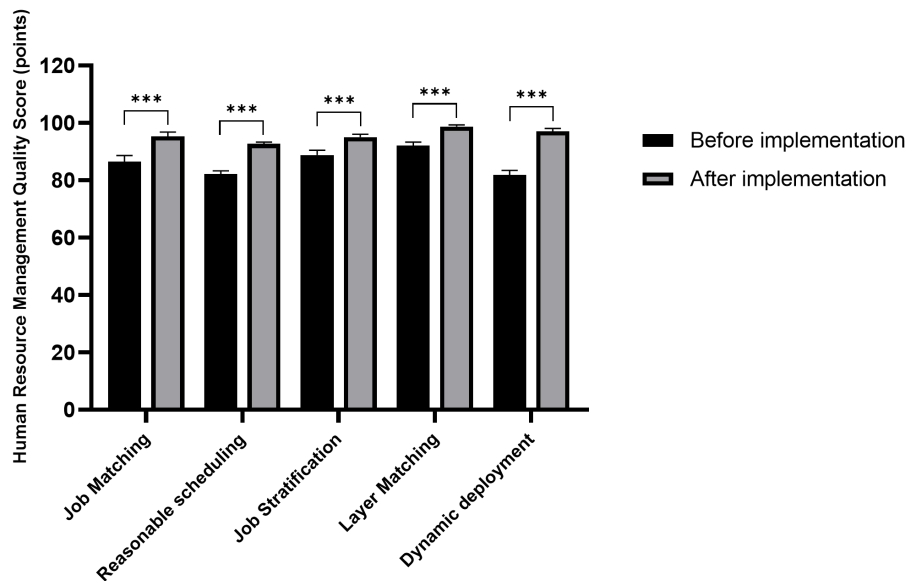


Figure 3 Comparison of nursing HRM quality evaluation before and after implementation (**P < 0.001)

2.4 Improvement in the quality of specialized nursing care (Table 5 and Figure 4)

Table 5 Comparison of nursing quality before and after the implementation of "manpower supermarket" management [n(%)].

Item	Total number of cases (n)	Mastery rate of the patient's condition	Health education efficiency	Patient rate for nursing care
Before	100	67(83.75)	61(76.25)	73(91.25)
After	98	79(98.75)	75(93.75)	79(98.75)
X^2 value		11.272	9.608	4.737
P value		0.001	0.002	0.030

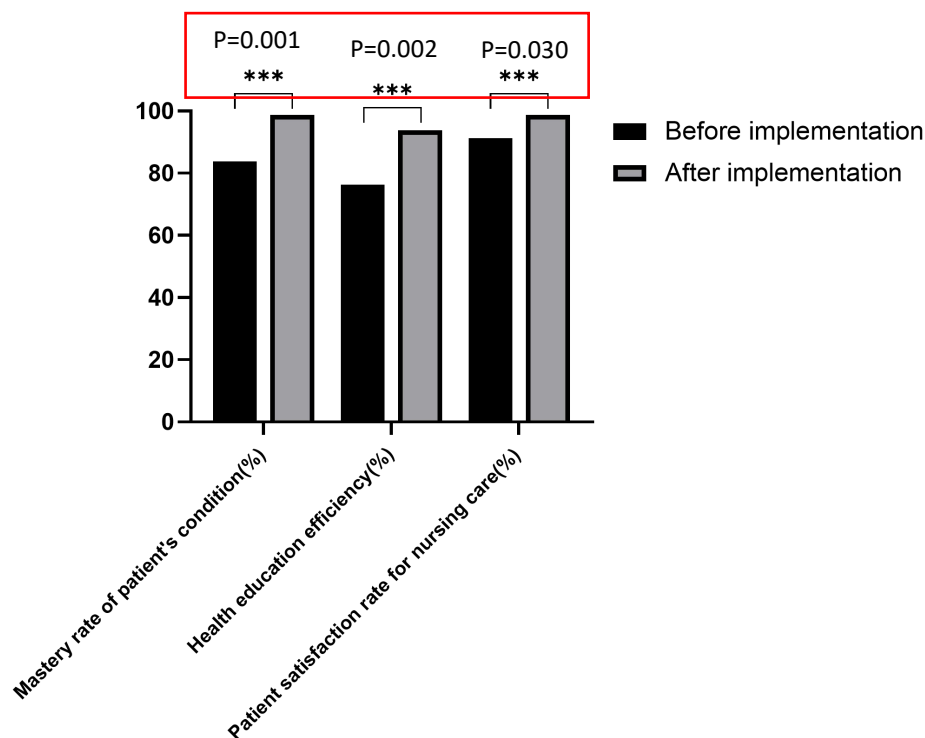


Figure 4 Comparison of nursing quality before and after the implementation of "manpower supermarket" management (**P < 0.001)

2.5 Patient complaint rate and nurse turnover rate

After the implementation of the "manpower supermarket" resource bank, the patient complaint rate was 1.62%, which was significantly lower than the 7.05% before the implementation ($P < 0.05$). The nurse turnover rate after the implementation was 2.75%, which was significantly lower than the 10.54% before the implementation ($P < 0.05$) (Table 6 and Figure 5).

Table 6 Comparison of patient complaint rate and nurse turnover rate before and after implementation

Item	Number of patient visits (n)	Patient complaint rate n (%)	Number of nurses (n)	Nurse turnover rate n (%)
Before	12468	879 (7.05)	370	39 (10.54)
After	13098	212 (1.62)	400	11 (2.75)

X^2/t value	461.268	19.213
P value	0.000	0.000

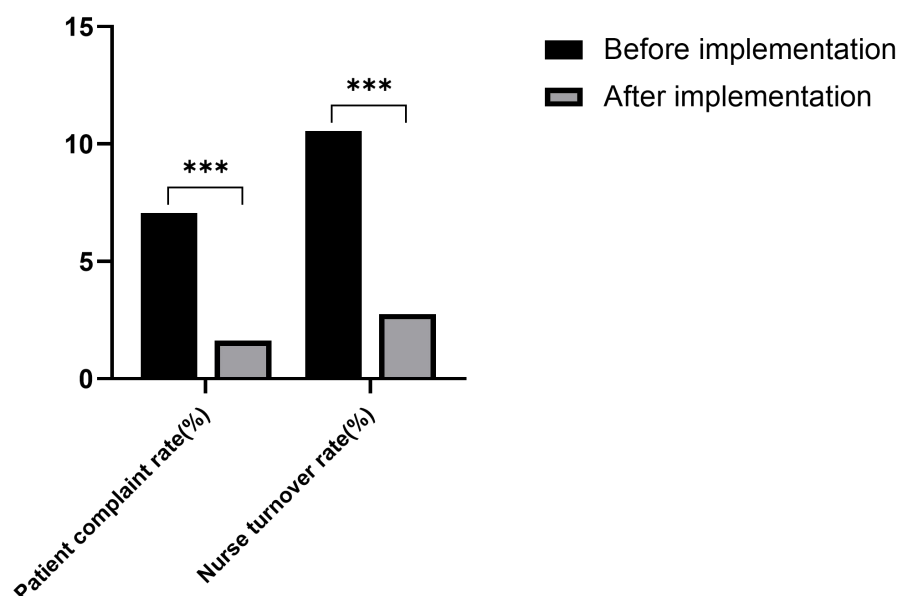


Figure 5 Comparison of patient complaint rate and nurse turnover rate before and after implementation)***P < 0.001)

3. Discussion

3.1 Supermarket operation of manpower management is conducive to the efficient deployment of nursing human resource

To ensure the quick and efficient execution of rescue and treatment, it is crucial to build a nursing emergency management system for public health emergencies and to increase nursing team coordination and administration [6-7]. The national epidemic prevention and control has reached a normalized state as of April 29, 2020 [8], and medical service institutions across the nation are actively looking into efficient human resource resilience utilization programs. The overall epidemic in the territory is sporadically disseminated, with sudden epidemic rebound occurring at any time. With the aid of the supermarket operation concept, the supermarket management of human resources management operates supermarket goods by seller needs while, at the same time, paying attention to the quality of goods and encouraging seller/customer purchases by continuously improving the quality of goods. By addressing the demands of employing units, the supermarket's management of human resources not only enables the ongoing growth and enhancement of personnel capabilities. Also, it keeps fostering staff development with the aid of the employing unit's practical training. As a result, it is feasible to reduce the need for nursing personnel in the existing medical care environment and shorten the nursing staff's maturation time.

Data from this study revealed that by putting the model into practice, 92% of the 400 nursing staff were swiftly and arbitrarily chosen for the human resource bank, and a total of 31 batches of staff were dynamically deployed to the bank, resulting in the deployment of 1,382 nurses)three times the number of nurses in the bank); in other words, every nurse in the bank experienced at least three job deployments per year.

3.2 Manpower supermarket operation improves the quality of nursing HRM

The findings of this study demonstrated that following implementation, the quality of the five key management components of nurse HRM—job matching, logical scheduling, job stratification, hierarchy, and dynamic deployment—had improved [9]. The study presented a cutting-edge management technique that adheres to the "people-centered" management idea. Through the development of specific posts and responsibilities, nursing staff completed their duties as expected in daily care, and the distribution of nursing service resources in the department was more reasonable. Additionally, each nursing staff member was able to demonstrate their value in their actual work as a result of the comprehensive evaluation of the functions of nursing staff in terms of their professional competence and professionalism. It combined with the three elements of supermarket operation guarantee, namely ① high-quality goods ② consumers with demand ③ reasonable operation management, and also follows these three principles, i.e. ① nursing staff matching the ability level ② hiring unit with demand ③ standardized nursing performance management. Through the development of homogenized general nursing training, the nursing department has generated basic-level)N1-N2) nursing employees since the deployment of this model. The recruiting needs of some medical units impacted by the seasons, such as the emergency infusion bank in the spring and fall and the trauma center's emergency personnel demands in the winter and spring, are also satisfied with the completion of three years of standardized training for such employees. when the entry-level nursing staff participated in an emergency hiring unit exercise and reached an advanced stage of skill development. The demand for immediate assistance in fighting diseases and online nursing communities came next. The nursing staff's demand for professional self-improvement rose as the work training progressed, and at that point, the acute and critical care enhancement bank was a pressing necessity for nursing staff. They will take part in the bank selection at the beginning of the year and watch for the acute care specialty's hiring requirements so they may advance quickly to higher title levels.

3.3 The supermarket operation of manpower management has improved the quality of specialized nursing care

The findings of this study demonstrated that nurses' understanding of patients' circumstances, the effectiveness of health promotion, and patient's satisfaction with nursing care all increased following the introduction of the supermarket operation of manpower management. To assure the execution of all nursing duties and enhance nursing quality, nurses collaborated with nursing tasks, content, procedures, and human resources. The study amply demonstrates how closely the manpower management model adheres to the needs of the employing firm as well as the nursing staff's personal development objectives. It even becomes a motivating factor for nurses. It somewhat increases nurses' motivation to work and relieves patients' difficulties [10]. By actively and thoroughly understanding patients' situations, executing correct health education, and adopting acceptable and efficient nursing measures, nurses support patients' early recovery.

3.4 The management of human resources in supermarkets aids in achieving exact manpower assistance

The cornerstone for guaranteeing quick and safe emergency care of public emergencies is the number and quality of manpower^[11]. Following the occurrence of a public emergency, the nursing department swiftly evaluates the expertise and knowledge of the staff in the reserve bank and executes specialized online and offline training. To improve the accuracy and security of the staff assistance, intensive training in emergency critical care first aid and transport under emergency circumstances was given to the reserve personnel. Following the findings, the hospital has completed the tasks of assisting Hubei Province, Shanghai City, Hainan Province, Zhenxiong County, and Nanjing Public Health Center from 2020 to 2022, all achieving the goal of "zero infection and safe return".

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